

n-BUTYL ALCOHOL

CAS Registry Number: 71-36-3

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

Molecular Formula: $\text{C}_4\text{H}_{10}\text{O}$

n-Butyl alcohol is a highly refractive, flammable, colorless liquid, which burns with a luminous flame. It has an odor similar to bananas and fuel oil. n-Butyl alcohol is incompatible with aluminum, chromium trioxide, and oxidizing materials. It is miscible with alcohol, ether, and many other organic solvents (Merck, 1989; Sax, 1989).

Physical Properties of n-Butyl Alcohol

Synonyms: n-butanol; 1-butanol; butyl hydroxide; butanol 1-hydroxybutane; propylmethanol; propylcarbinol

Molecular Weight:	74.12
Boiling Point:	117.2 °C
Melting Point:	-89.5 °C
Flash Point:	36 - 38 °C
Vapor Density:	2.6 (air = 1)
Vapor Pressure:	7.024 mm Hg at 25 °C
Density/Specific Gravity:	0.8097 at 20/4 °C
Log/Octanol Water Partition Coefficient:	0.88
Henry's Law Constant:	5.57×10^{-6} atm-m ³ /mole
Conversion Factor:	1 ppm = 3.03 mg/m ³

(Howard, 1990; HSDB, 1991; Merck, 1989)

SOURCES AND EMISSIONS

A. Sources

Sources of n-butyl alcohol include facilities where it is used as a solvent for fats, waxes, resins, shellac, varnish, gums, hydraulic fluids, and detergent formulations. It is also used in the manufacture of lacquers, dyestuffs, rayon, detergents, plasticizers, in the preparation of paraffin embedding materials and esters such as butyl acetate, and as a dehydrating substance (Merck, 1989; Howard, 1990; Sax, 1987).

The primary stationary sources that have reported emissions of n-butyl alcohol in California

are glass product manufacturers, automotive repair shops, and automotive dealers (ARB, 1997b).

n-Butyl alcohol (butyl-alcohol) is registered as an adjuvant. It is used to facilitate the application of other agricultural products. The licensing and regulation of pesticides for sale and use in California is the responsibility of the Department of Pesticide Regulation (DPR). Information presented in this fact sheet regarding the permitted pesticidal uses of n-butyl alcohol has been collected from pesticide labels registered for use in California and from DPR's pesticide databases. This information reflects pesticide use and permitted uses in California as of October 15, 1996. For further information regarding the pesticidal uses of this compound, please contact the Pesticide Registration Branch of DPR (DPR, 1996).

B. Emissions

The total emissions of n-butyl alcohol from stationary sources in California are estimated to be at least 15,000 pounds per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

n-Butyl alcohol can be produced by the fermentation of starch by two strains of bacteria, clostridium butylicum and clostridium acetobutylicum (Howard, 1990). It is reported to be present in peppermint oil from Brazil, Achillea ageratum, tea, and in apple aroma (HSDB, 1991).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient concentrations of n-butyl alcohol.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of n-butyl alcohol was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

The only important chemical loss process for n-butyl alcohol in the troposphere is expected to be by reaction with the hydroxyl (OH) radical. The calculated half-life and lifetime of n-butyl alcohol due to reaction with the OH radical is estimated to be about 1.2 days and 1.7 days, respectively (Atkinson, 1995). A major product of the OH radical reaction is expected to be butyraldehyde (Atkinson, 1994).

AB 2588 RISK ASSESSMENT INFORMATION

Although n-butyl alcohol is reported as being emitted in California from stationary sources, no health values (cancer or non-cancer) are listed in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to n-butyl alcohol are inhalation, ingestion, or dermal contact.

Non-Cancer: n-Butyl alcohol is a central nervous system depressant. Symptoms of overexposure include headache, muscle weakness, giddiness, ataxia, confusion, vertigo, or coma. n-Butyl alcohol may be irritating to the respiratory system, causing coughing and difficult breathing, and occasionally accumulation of fluid in the lung. Effects on the eyes may include irritation, inflammation of the cornea, tearing, or light sensitivity (HSDB, 1995). Skin contact may result in dermatitis and cracking (Sittig, 1991). Hemorrhage of the gastrointestinal system and kidney damage have been reported. Auditory nerve damage has resulted from exposure to n-butyl alcohol (U.S. EPA, 1994a).

The United States Environmental Protection Agency (U.S. EPA) has established an oral Reference Dose (RfD) of 0.1 milligrams per kilogram per day based on neurological effects in rats. No Reference Concentration (RfC) has been established (U.S. EPA, 1995a).

Cancer: The U.S. EPA has classified n-butyl alcohol in Group D: Inadequate evidence as to its carcinogenic potential (U.S. EPA, 1995a). The International Agency for Research on Cancer has not classified n-butyl alcohol as to its carcinogenic potential (IARC, 1987a).

